

DOUBLE-SKIRTED GROUND PLANE ANTENNA  
 Revised Aug 10, 1992 (Design by WA6TVN)  
 This Design is Patent Pending !

: You may make this for  
 : for YOUR OWN USE ONLY!  
 :  
 : \*\*NOT FOR PROFIT\*\*

Freq	-A-	-B-
146	19"	20"
223	12 3/4"	13 1/4"
445	6 3/8"	6 5/8"

radiator -A-  
 upper radials -B-  
 copper pipe -B-  
 lower radials -B-

-A- Radiator final length.  
 -B- ALL other final lengths.

Materials List:

- 1 - SO-239 X =Insulated X: NOT for BBS Use !
- 2 - SS Hose Clamps, 3/4 - 1 1/4" dia. Support X: Personal construction
- 2 - SS Hose Clamps to hold Copper Pipe to Insulated Support. X: \*\*\*ONLY\*\*\*\*
- 1 - Copper Pipe 3/4 (Length = Dimension B) X: Art Hoffman PO Box 413
- 8 - Radials - 3/32" Brazing Rod (Dim B + 3") : Carmel Ca. 93921
- 1 - Radiator - 3/32 Brazing Rod (Dim B + 1") : 408-624-4374
- 1 - 52 Ohm Feed Line with PL-259 at antenna end | 50 Ohm Coax to Radio
- 1 - Support fixture: non-metallic for 1/4 wavelength below pipe (Dim B)

- Construction (146 MHz model) - (Works well on BOTH 2 and 440 !)
- \* Cut copper water pipe to 20". With hacksaw, slit top of pipe down 1 1/2 inch - producing 6 "fingers" on top of pipe.
- \* Bend one end of 8 rods into tight "J", short leg length of 3/4 inch.
- \* Take 4 J rods. Bend the 3/4" U-section of each "J" to 90 degrees - these will be the bottom radials. Both legs of the "U" will seat against the copper pipe and will help stabilize the radials.
- \* Solder 3/32" rod to into the SO-239. Measure and trim to 19".

Assembly: (2 MTR)

- \* Pass 52 ohm coax terminated in a PL-259 thru the copper pipe, exiting thru the slotted end. Attach to the SO-239. Settle SO-239 onto top of pipe. Pass the long leg of a "J" rod up thru each of the SO-239 screw holes. Place a hose clamp over the ends of the J rods - tighten to secure the upper radials AND squeeze the slotted pipe section against the PL-259.
- \* Bend these upper radials to 90 degrees relative to the pipe. Measure from the pipe centerline, out the radials, and cut at 20 inches. Then bend the upper radials down, until they form a 30 degree angle with the pipe. Check the droop angle - The tip of each upper radial will be 10" from the centerline of the pipe (dim. B/2) when the droop angle is 30 degrees.
- \* The Bottom radials are mounted at the very bottom of the pipe. The hose clamp is placed above the radials and holds the 90 degree U-sections to the pipe. Cut radials at 20" measured from the centerline of the pipe.
- \* About the "j" bends: All they really are for is to make a "Wide" surface against the Copper Pipe, so the CLAMPS can hold the Radials in a steady direction. A single "L" bend in the radials lets them swing in ANY DIRECTION.
- \* SWR as measured and accepted - (146 MHz design used as a dual-band antenna)

Freq	144	145	146	147	148	430	435	440	445	450
SWR	1.1	1.1	1.12	1.15	1.2	1.4	1.6	1.3	1.2	1.4

- \* Design elements have proven critical for performance duplication.
- \* Most SO-239s have an excess depth on the PL-259 side, and a very Shallow Hole for the wire. If you use a 3/32 drill and drill all the way thru, and use a "DEPTH GAUGE" to position the RADIATOR DEEPER before soldering, the antenna becomes MUCH Stronger.
- \*\*\* It is VERY IMPORTANT that the antenna NOT be Supported with a METAL MAST! Dimension B, inches of INSULATING MAST SHOULD BE USED!  
 The "Hose Clamps" that hold the COPPER PIPE to the INSULATOR MAST MUST be Electrically INSULATED from the COPPER PIPE.
- \*\*\*\*\*THAT IS VERY IMPORTANT\*\*\*\*\* SO AS NOT TO CHANGE THE ELECTRICAL LENGTH OF THE COPPER PIPE.
- \*\*\*DO NOT PAINT ELEMENTS, as that will CHANGE ELECTRICAL LENGTH !  
 Use "Car Wax" to prevent CORROSION.